

**Response Under 37 CFR § 1.116 \* -- Expedited Procedure – Examining Group 1631**  
**Docket No. 1073.060**  
**U.S. Serial No. 09/595,096**

## REMARKS

Claims 1-30 were originally filed with the application on June 15, 2000, and are currently pending.

### Rejections Under 35 U.S.C. § 101

Claims 1-20 are rejected under 35 U.S.C. § 101 on the grounds that the claimed invention is directed to non-statutory subject matter. Claims 1-30 are rejected under 35 U.S.C. §101 as lacking patentable utility. These rejections are respectfully, but strenuously, traversed.

The preambles of independent claims 1, 11 and 21 have been amended so as to recite explicitly that the present invention is directed to "modeling ligand-protein complexes so as to identify ligands likely to have therapeutic activity." The amended claims find support in the specification as filed.

The Examiner's rationale for the "non-statutory subject matter" and "lack of utility" rejections of claims 1 to 10 is that the claimed methods "do not provide a concrete, tangible and useful result," simply because these claims fail to recite "a specific protein and/or any correlation with a known disease or disorder associated with either a protein or ligand." The Examiner's position, apparently, is that a process would constitute statutory subject matter and be useful if it were directed to a single, specifically identified protein or therapeutic condition, but the same process – if broadly applicable to any therapeutically relevant protein – no longer is useful or constitutes statutory subject matter.

It is noteworthy that the Examiner has an entirely different rationale for the "non-statutory subject matter" rejection of claims 11 to 20, which are directed to a "computer-aided system" for performing method steps identical to those recited in claims 1 to 10, respectively. Here, the Examiner indicates that there is no statutory subject matter because the claims allegedly fail to recite "physical or hardware limitations."

In contrast, the Examiner indicates that claims 21 to 30, directed to a computer-readable medium comprising a program, do constitute statutory subject matter, even though the method steps performed using such program are identical to those recited in claims 1 to 10 (and 11 to 20), respectively.

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The Examiner's "non-statutory subject matter" rejection of claims 1 to 10 and 11 to 20 is completely inconsistent with the favorable position taken with respect to claims 21 to 30. Moreover, such rejections seem to have been made in disregard of the current case law, and also in disregard of the guidelines set forth in the MPEP.

First and foremost, "[f]or the purposes of a 35 U.S.C. 101 analysis, it is of little relevance whether the claim is directed to a machine or a process. The legal principles are the same." MPEP 2106(IV)(B)(2), citing AT&T Corp. v. Excel Communications, Inc., 172 F.3d, 1352, 1357, 50 USPQ2d 1447, 1451 (Fed. Cir. 1999). As the Court stated clearly in AT&T, "we consider the scope of Section 101 to be the same regardless of the form – machine or process – in which a particular claim is drafted." Id. Thus, it is clearly erroneous for the Examiner to have concluded that claims to a "method" or a "computer-aided system," on the one hand, do not recite statutory subject matter, while claims to a "program storage device," on the other hand, do recite statutory subject – where these respective groups of claims recite identical method steps.

Moreover,

[t]he plain and unambiguous meaning of section 101 is that any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if it meets the requirements for patentability set forth in Title 35, such as those found in sections 102, 103, and 112. The use of the expansive term "any" in section 101 represents Congress's intent not to place any restrictions on the subject matter for which a patent may be obtained beyond those specifically recited in section 101 and other parts of Title 35.

MPEP 2106(IV)(A), quoting In re Alappat, 33 F.3d 1526, 1542, 31 USPQ2d 1545, 1556 (Fed. Cir. 1994) (in banc) (emphasis added). The only subject matter that courts have found to be outside the four statutory categories of invention is limited to "abstract ideas, laws of nature and natural phenomena." MPEP 2106(IV)(A). "Claims to computer-related inventions that are non-statutory fall into the same general categories as nonstatutory claims in other arts, namely natural phenomena such as magnetism, and abstract ideas or laws of nature which constitute 'descriptive material.'" MPEP 2106(IV)(B)(1). However, the Examiner has not alleged – and cannot allege – that the instant claims are limited to "abstract ideas, laws of nature [or] natural phenomena."

For computer-related subject matter to be statutory, the claims must recite "a step or act of producing something that is concrete, tangible and useful." MPEP 2106(IV)(B)(2)(b)(ii), citing

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AT&T, supra, 172 F.3d at 1358, 50 USPQ2d at 1452. Such certainly is true of the amended claims, which recite specific method steps directed to the modeling of ligand-protein complexes so as to identify ligands likely to have therapeutic activity. The broadest claims each recite the following steps:

- performing a pre-docking conformational search and generating multiple solution conformations of a ligand therefrom;
- generating a binding site image of a protein, said binding site image comprising multiple hot spots;
- matching hot spots of the binding site image to atoms in at least one conformation of the multiple solution conformations of the ligand to obtain at least one position of the ligand relative to the protein in a protein-ligand complex; and
- optimizing the at least one position of the ligand while allowing translation, orientation and rotatable bonds of the ligand to vary, and while holding the protein fixed.

It is respectfully submitted that the foregoing steps do, in fact, produce "something that is concrete, tangible and useful" – a model of a ligand-protein complex that is indicative of whether the ligand will have therapeutic activity. The following comparison with the facts and holding of the above-cited AT&T case should be instructive.

In AT&T, the patent concerned "a message record for long-distance telephone calls that is enhanced by adding a primary interexchange carrier ('PIC') indicator." 172 F.3d at 1353, 50 USPQ2d at 1448. In essence, the patent merely called for "the addition of a data field into a standard message record to indicate whether a call involves a particular PIC (the 'PIC indicator')." 172 F.3d at 1354, 50 USPQ2d at 1448. The claims included (1) "the step of 'generating a message record for an interexchange call between an originating subscriber and a terminating subscriber,'" and (2) "the step of adding a PIC indicator to the message record." 172 F.3d at 1354, 50 USPQ2d at 1449. The Federal Circuit held that "all the claims asserted fall comfortably within the broad scope of patentable subject matter under Section 101," since the claims were directed to a "tangible, useful result." 172 F.3d at 1358, 1361, 50 USPQ2d at 1451, 1454.

The AT&T Court expressly rejected certain arguments – arguments quite similar to those used by the Examiner in rejecting instant claims 11 to 20 – that the claims must result in a "physical transformation" or contain a "physical limitation": Physical transformation "is not an invariable requirement, but merely one example of how a mathematical algorithm may bring

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about a useful application." 172 F.3d at 1358, 50 USPQ2d at 1452. Moreover, the belief that a physical limitation is necessary "reflects a misunderstanding of our case law." 172 F.3d at 1359, 50 USPQ2d at 1452.

If the Examiner persists in rejecting the amended claims as not providing a concrete, tangible and useful result, it is respectfully requested that the Examiner provide an explanation of why the amended claims are to be viewed differently from those approved by the Court in AT&T.

Further, the applicants have asserted, as reflected in the amended claims, that the invention is useful for the practical purpose of identifying protein-bound ligands likely to have therapeutic activity. The present invention already has been demonstrated to have succeeded for this purpose. See specification at pages 28 to 30. Thus, the language of the MPEP would seem to apply: "If the applicant has asserted that the claimed invention is useful for any particular practical purpose (i.e., it has a 'specific and substantial utility') and the assertion would be considered credible by a person of ordinary skill in the art, do not impose a rejection based on lack of utility." MPEP 2107(II).

The present invention can be commercialized in the form of software for use by pharmaceutical companies to model protein-ligand complexes, in order to identify drug candidates. Thus, the invention certainly has the "practical utility" and "real-world" value required for patentable utility (MPEP §2107.01(I), quoting Nelson v. Bowler, 626 F.2d 853, 856, 206 USPQ 881, 883 (CCPA 1980).

Finally, with respect to both the "non-statutory subject matter" and "lack of utility" rejections, it is respectfully submitted that the Examiner's reference to the Trilateral Project WM4 documents (relating to *in silico* screening methods) is inapposite. The Trilateral Project documents focus on claims that would cover specific proteins based solely on their atomic coordinates. In many of the cases, it is assumed that appropriate protein-modeling algorithms already are well-known in the art. The primary concern in such a situation is that an applicant may attempt to obtain patent protection on a certain protein without the benefit of having determined its actual chemical structure or without knowing its specific therapeutic relevance. Then, unfortunately, such a patent might be used to preclude other parties from conducting research and developing more complete information about such protein.

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The issues addressed by the Trilateral Project documents are not unlike those presented by recent attempts to claim certain genes based merely on their homology to other genes – and without the benefit of complete sequence information for the claimed gene, much less any evidence of its biological function. Certainly the proposed practice of claiming proteins, based solely on their 3-D coordinates, warrants the USPTO's careful scrutiny. Nonetheless, in most of the scenarios presented in the Trilateral Project documents, the USPTO has indicated that it would find that the claims meet the requirements of 35 U.S.C. 101.

Unlike the situations reviewed in the Trilateral Project documents, the amended claims are not directed to the atomic coordinates of a specific protein. Rather, the claims are directed to a broadly useful, computer-based method, which can be incorporated into a software product that would have substantial value throughout the pharmaceutical industry for identifying drug candidates. As a clear-cut matter of law, the inventive claims cannot be denied patent protection for alleged lack of statutory subject matter or lack of utility.

In view of the above amendments and remarks, applicants respectfully request allowance of all claims pending herein.

*Respectfully submitted,*

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